

CLAIMS:

1. An aquaculture apparatus, comprising:
a photosynthetic culture tank;
5 an enclosure associated with the photosynthetic culture tank and enclosing a gas
above contents of the photosynthetic culture tank; and
a sensor for sensing a level of at least one component of the gas.
2. The apparatus of claim 1, wherein the enclosure is a cover fitted to the
10 photosynthetic culture tank.
3. The apparatus of claim 2, in which the cover is at least one of the group of
translucent and transparent.
- 15 4. The apparatus of claim 1, wherein the enclosure is a room in which the
photosynthetic culture tank is located.
5. The apparatus of claim 1, wherein the sensor senses a level of nitrogen compounds.
- 20 6. The apparatus of claim 1, wherein the sensor senses a level of carbon dioxide.
7. The apparatus of claim 1, wherein the sensor senses a level of phosphorous
compounds.
- 25 8. An aquaculture apparatus, comprising:
a photosynthetic culture tank;
a production culture tank; and
a carbon dioxide stripper associated with the production culture tank and coupled to
the photosynthetic culture tank to supply carbon dioxide stripped from water in the
30 production culture tank to water in the photosynthetic culture tank.
9. An aquaculture apparatus, comprising:
a photosynthetic culture tank;

a production culture tank;
trigger signal generator associated with at least one of the photosynthetic culture
tank and the production culture tank; and
a water transfer device to selectively enable transfer of water between the production
5 culture tank and the photosynthetic culture tank upon receipt of a trigger signal from the
trigger signal generator.

10 10. The apparatus of claim 9, wherein the trigger signal generator generates the trigger
signal in relation to a nitrogen level of the water in the production culture tank.

11. The apparatus of claim 9, wherein the trigger signal generator generates the trigger
signal in relation to a nitrogenous waste level of the water in the photosynthetic culture
tank.

15 12. The apparatus of claim 9, wherein the trigger signal generator generates the trigger
signal in relation to a water level of the water in the photosynthetic culture tank.

13. A method of aquaculture, comprising:
growing a photosynthetic first species in a photosynthetic culture tank;
20 providing the first species to a second species in a food production culture tank that
eats the first species;
providing the second species to a fish in a production culture tank;
harvesting the fish; and
providing a waste product to a scavenging species in a scavenging species tank.

25 14. The method of claim 13, wherein the waste product is at least one portion of a
harvested fish.

30 15. The method of claim 13, wherein the waste product is at least one of the group of an
unharvested dead fish, a sample of the photosynthetic first species, and a sample of the
second species.

16. The method of claim 13, further comprising the act of providing water from the food

production culture tank to the scavenging species tank.

17. The method of claim 13, further comprising the act of harvesting caviar from the fish.

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18. A method for producing caviar, comprising:
growing a photosynthetic first species in a photosynthetic culture tank;
enclosing a gas above water in the photosynthetic culture tank;
monitoring a level of a gas in the water in the photosynthetic culture tank by the use
10 of a sensor sensing the gas above the water in the photosynthetic culture tank;
providing the first species to a second species in a food production culture tank that
eats the first species;
providing the second species to a fish in a production culture tank; and
harvesting caviar from the fish.

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19. The method of claim 18, further comprising providing a waste product from the fish
to the photosynthetic first species for consumption by the photosynthetic first species.

20. A method for producing caviar, comprising:
20 growing a photosynthetic first species in a photosynthetic culture tank;
providing the first species to a second species in a food production culture tank that
eats the first species;
providing the second species to a fish in a production culture tank;
stripping carbon dioxide from the water in the production culture tank and supplying
25 the carbon dioxide to water in the photosynthetic culture tank; and
harvesting caviar from the fish.

21. A method of aquaculture, comprising:
growing a photosynthetic first species in a first tank, water in the first tank having a
30 first water chemistry;
providing the first species to a second species in a second tank that eats the first
species, water in the second tank having a second water chemistry different from the first
water chemistry; and

providing the second species to a fish in a third tank.

22. The method of claim 21, wherein the second water chemistry has less nitrogenous waste and carbon dioxide than the first water chemistry.
- 5 23. The method of claim 21, wherein water in the third tank has a third water chemistry, different from both the first water chemistry and the second water chemistry.
24. The method of claim 21, wherein the first species is not provided to the fish.
- 10 25. The method of claim 21, further comprising the act of circulating water from the first tank to a filter dedicated to the first tank and back into the first tank.
26. The method of claim 25, further comprising the act of circulating water from the
15 second tank to a filter dedicated to the second tank and back into the second tank.
27. The method of claim 26, further comprising the act of circulating water from the third tank to a filter dedicated to the third tank and back into the third tank.
- 20 28. The method of claim 21, further comprising the acts of stripping carbon dioxide from the water in the third tank and supplying the carbon dioxide to water in the first tank.
29. The method of claim 21, further comprising the act of providing a water storage device coupled to the first tank, the second tank and the third tank.
- 25 30. The method of claim 21, further comprising the act of activating a water transfer device to enable transfer of water between the third tank and the first tank.
31. The method of claim 30, wherein the act of activating is triggered by a nitrogen
30 compound level of the water in the third tank.
32. The method of claim 30, wherein the act of activating is triggered by a nitrogen compound level of the water in the first tank.

33. The method of claim 30, wherein the act of activating is triggered by a water quantity in the first tank.
- 5 34. The method of claim 21, wherein the first species is phytoplankton and the second species is zooplankton.
35. The method of claim 21, wherein the first species is a non-floating plant.
- 10 36. The method of claim 21, wherein the fish is a sturgeon.
37. The method of claim 21, wherein a ratio of volumes of water in the third tank and in the first tank is 2:1.
- 15 38. A method of aquaculture, comprising:
growing a photosynthetic first species in a first tank;
providing the first species to a second species in a second tank that eats the first
species;
processing the second species into pellets; and
20 providing the pellets to a fish in a third tank.
39. The method of claim 38, wherein the act of processing includes adding nutritional supplements.